



STARS ACADEMY LAHORE

MULTAN CAMPUS

Opp: City Hospital 1674/Peer Khurshid Colony Road, Near Chungi No.9, Multan
Head office: 590-Q Main Boulevard, Johar Town Lahore, 0321-9432186, 0321-4693044, www.stars.edu.pk

STARS ENTRY TEST SYSTEM-2019

TEST SESSION MDCAT

Test Code: CTS-5

Time Allowed: 150min

Biology

- In a DNA percentage of thymine is 20%. What is the percentage of guanine?
A) 20% B) 40% C) 30% D) 60%
- Adenosine diphosphate contains _____ high-energy bond(s):
A) One B) Two C) Three D) Four
- Diameter of DNA is constant due to:
A) Hydrogen bonds between bases B) Phosphodiester bond
C) Disulphide bond D) Covalent bond
- in a double stranded DNA, the sequence of base pairs in one strand is AGCTAAGC. What is the complementary sequence on the other strand?
A) TCGATTCG B) UCGAUUG C) AGCTAAGC D) CAUTAUCG
- in DNA, when A, G, C and T occurs, their association is as per which of the following pair?
A) AC-GT B) AG-CT C) AT-GC D) All of these
- in DNA helix, cytosine is paired with guanine by triple _____ bond:
A) Covalent B) Hydrogen C) Ionic D) Coordinate covalent
- Which of the following will not occur during complimentary base pairing?
A) A-T B) C-G C) U-G D) A-U
- Codons causing chain termination are:
A) TAA, TGA, TAG B) AGT, TAG, UGA C) GAT, AAT, AGT D) UAA, UAG, UGA
- Initiation codon in eukaryotes is:
A) AUU B) AUG C) AAT D) CCU
- During translation AGA specifies which amino acid in bacteria and human
A) Alanine B) Phenylalanine C) Serine D) Arginine
- in the genetic code dictionary, how many codons are used to code for all the 20 amino acids?
A) 20 B) 60 C) 61 D) 64
- What would happen if in a gene encoding a polypeptide of 50 amino acids, the 25th codon UAU is mutated to UAA?
A) A polypeptide of 49 amino acids will be formed,
B) A polypeptide of 25 amino acids will be formed
C) A polypeptide of 24 amino acids will be formed
D) Two polypeptides of 24 and 25 amino acids will be formed
- Types of RNA polymerase required in the eukaryotic nucleus for RNA synthesis is/are:
A) 1 B) 2 C) 3 D) 4
- mRNA is synthesized on DNA template in which direction:
A) 3' → 5' B) 5' → 3' C) Both a & b D) None of these
- During transcription, the DNA site at which RNA polymerase binds is called:
A) Receptor B) Enhancer C) Promoter D) Regulator
- During transcription, the nucleotide sequence of the DNA strand that is being coded is ATACG, then the nucleotide sequence in mRNA would be:
A) TATGC B) TCTGG C) UATGG D) UAUGC
- RNA polymerase II synthesizes:
A) rRNA B) tRNA C) mRNA D) cDNA
- in eukaryotes, the two RNA polymerase binding sites are:
A) -25 & -10 B) -25 & -75 C) -35 & -10 D) -35 & -70
- Which of the following statement is correct?
A) Leading strand has a discontinuous replication
B) Lagging strand has a continuous replication
C) Removal of primer is done by DNA polymerases I
D) Okazaki fragments joined by gyrase
- Okazaki fragments are present in:

- A) DNA replication
C) Translation
B) Transcription
D) Reverse Transcription
21. During replication of DNA, its two strands separate. Each of these serves as a template for the formation of new strands. Such type of replication is called:
A) Dispersive B) Conservative C) Flexible D) Semi-conservative
 22. The genetic instructions for forming a polypeptide chain are carried to the ribosome by the:
A) tRNA B) rRNA C) mRNA D) ATP
 23. The RNA which picks up specific amino acids from the amino acid pool in the cytoplasm to ribosome during protein synthesis is called:
A) rRNA B) mRNA C) tRNA D) None
 24. Anti codon are present on:
A) rRNA B) mRNA C) tRNA D) None
 25. Amino acid sequence in protein synthesis is decided by the sequence of.
A) rRNA B) mRNA C) tRNA D) None
 26. During translation, the _____ site within the ribosome hold the growing amino acid chain while the _____ site holds the next amino acid to be added to the chain:
A) A, P B) P, A C) A, E D) E, P
 27. The enzyme involved in amino acid activation
A) ATP synthetase B) Aminoacyl tRNA synthetase
C) Aminoacyl mRNA synthetase D) Aminoacyl rRNA synthetase
 28. Nucleic acids are strong acids. The acidity is due to
A) phosphates B) sugar C) nitrogen bases D) H-bond
 29. Adenylic acids is
A) Adenine + ribose + phosphate C) Adenine + deoxyribose + phosphate
B) Adenosine + sugar D) Adenine + sugar
 30. If DNA has 10 spirals, the length of DNA will be
A) 34 Å B) 340 Å C) 640 Å D) 64 Å
 31. RNA differs from DNA in nature of
A) Sugar and purines C) sugar and pyrimidines
B) purines and phosphate D) sugar and phosphate
 32. A condensation product of nitrogen base and pentose sugar is
A) nucleotide C) nucleic acid
B) nucleoside D) None of these
 33. Nitrogen base is attached to pentose sugar in a nucleoside at carbon atom
A) 1 B) 2 C) 3 D) 5
 34. Basic unit (monomer) of DNA molecule is
A) nitrogenous base C) deoxyribose nucleotide
B) deoxyribose-nucleoside D) pentose sugar
 35. DNA was discovered by
A) Miescher B) Altman C) Watson D) Wilkins
 36. A molecule of ATP is structurally most similar to a molecule of
A) RNA nucleotide C) DNA nucleotide
B) Amino acid D) RNA nucleoside
 37. Adenosine is
A) nucleoside B) nucleotide C) a purine D) a pyrimidine
 38. Thymine differs from Uracil in having
A) CH₃ group B) C = O group C) CHO group D) COOH group
 39. The difference in deoxyribose and ribose sugar is in the
A) first carbon B) second carbon C) 4th carbon D) 5th carbon
 40. Similarity of RNA and DNA is that both
A) are double-stranded C) have similar sugars
B) are polymers of nucleotides D) have similar pyrimidines
 41. Two strands of a molecule of DNA are linked sidewise by
A) ester bonds C) glycosidic bonds
B) purine-pyrimidine hydrogen bonds D) all the above
 42. The smallest type of RNA is
A) tRNA B) mRNA C) rRNA D) genetic RNA
 43. Which of the following RNA have clover leaf structure?
A) transfer RNA B) messenger RNA C) ribosomal RNA D) heterogenous RNA
 44. In double helix model of DNA how far is each base pair from next?
A) 0.034 nm B) 3.4 nm C) 0.34 nm D) 34.nm
 45. The double stranded helical structure of DNA is maintained by
A) amide bonds B) H-bonds C) covalent bonds D) phosphodiester bonds
 46. If A = 120 and C = 120, then a piece of DNA will have nucleotides.

47. In *E. coli* DNA has 18% of bases of cytosine. What will be the fraction of adenine?
 A) 18% B) 32% C) 36% D) data insufficient
48. Which of the following is a double ringed structure?
 A) Guanine B) Uracil C) Thymine D) Cytosine
49. RNA is synthesized on
 A) both strands of DNA C) on sense strand of DNA
 B) on anti sense strand of DNA D) on cDNA
50. Genetic information in a DNA molecule is coded in the
 A) sequence of nucleotides C) base pairing
 B) turning pattern of helix D) distance between base pairs
51. Short stature, webbed neck, complete absence of germ cells, person is suffering from:
 A) Patau syndrome B) Turner syndrome
 C) Down's syndrome D) Klinefelter syndrome
52. The following conditions are caused by non-disjunction except:
 A) Phenylketonuria C) Down's syndrome
 B) Patau's syndrome D) Edward's syndrome
53. The commonest mechanism of genetic abnormality in a case of Trisomy 21 is:
 A) Non-disjunction in maternal gamete B) Non-disjunction in paternal gamete
 C) Translocation to chromosome 14 D) Non-disjunction in any parental gamete
54. The basic unit of heredity is called:
 A) Gene B) Allele C) Genome D) Gene pool
55. The process of mitosis ensures
 A) Change in nature of genes
 B) A reduction in the number of chromosomes
 C) An increase in the size of cells
 D) Same number of chromosomes in daughter cells
56. What is the importance of the fact that meiosis occurs during the formation of gametes
 A) It allows the no. of sex cells to become half
 B) It prevents variation appearing the phenotype
 C) It produces haploid sex cells in preparation of fertilization
 D) It prevents asexual reproduction
57. In which of the following, daughter nuclei contain only one chromosome from each original pair of the chromosomes
 A) mitosis but not meiosis C) meiosis but not mitosis
 B) both mitosis and meiosis D) neither mitosis and meiosis
58. Mitotic apparatus of a plant cell consists of
 A) spindle fibers B) aster C) centrioles D) all of these
59. Mitosis takes place during
 A) healing of wound C) development and growth
 B) vegetative propagation D) all of these
60. Spindle fibers are formed by special type of proteins called
 A) histone B) tubulin C) transein D) fibrin
61. Synapsis occurs during
 A) zygotene B) pachytene C) diplotene D) diakinesis
62. A bivalent consists of
 A) two chromatids C) four chromatids
 B) one homologous chromosome D) a typical chromosome
63. Which of the following is not related to meiosis
 A) involve in sexual reproduction
 B) variation are produced
 C) maintains chromosome number constant from generation to generation
 D) homologous pairs of chromosomes are attached to each other
64. A cell of human being has 46-chromosomes, it divides to form some daughter cells, each having 23-pairs of chromosome. The division would be
 A) mitosis B) amitosis C) meiosis D) budding
65. What is monosomy ($2n-1$)
 A) Down syndrome C) One missing chromosome in individual
 B) Klinefelter D) None of these
66. The critical phase of cell cycle
 A) prophase C) anaphase
 B) metaphase D) telophase

67. The membrane of Golgi vesicle form which of these during cytokinesis of plant cells
 A) Cell plate C) Cell membrane
 B) Primary wall D) None of these
68. During which period of interphase (cell cycle) DNA is synthesized?
 A) G1 C) S
 B) G2 D) G0
69. Phenylketonuria is an example of:
 A) Polyploidy C) Inversion
 B) Transmutation D) Point mutation
70. The mutation which causes change in the sequence of DNA is called:
 A) Point mutation C) Deletion
 B) Chromosomal mutation D) Inversion
71. It is responsible for correct initiation of transcription:
 A) Initiation factor C) Sigma factor
 B) Elongation factor D) Transcription factor
72. If a couple has three daughters, what are the chances that the fourth child will be a son?
 A) 100% C) 50%
 B) 75% D) 0%
73. RNA polymerase consists of:
 A) Sigma factor C) Sigma factor and Core enzyme
 B) Core enzyme D) Sigma factor and full enzyme
74. Nucleotide sequence has binding affinity for RNA polymerase in prokaryotes:
 A) – 75 TATAAT C) – 33 TATAAT
 B) – 35 TATAAT D) – 10 TATAAT
75. In fungi mitochondria, tryptophan is encoded by:
 A) UGA C) UGG
 B) UAG D) UAA
76. What is added to the 3'-end of many eukaryotic mRNAs after transcription?
 A) Introns C) Cap of modified G nucleotide
 B) Poly A tail D) Trinucleotide CCA
77. Examples of chromosomal aberrations are:
 A) Sickle cell anemia C) Down's syndrome
 B) Phenylketonuria D) Both a and b
78. Contraction of spindles occur during:
 A) Prophase C) Anaphase
 B) Metaphase D) Telophase
79. From each pair of centrioles _____ sets of microtubules originate:
 A) 2 C) 4
 B) 3 D) 5
80. In case of neurons, post mitotic cell escapes cell cycle and remain in _____ phase without proliferating further:
 A) G₀ phase C) G₂ phase
 B) G₁ phase D) S phase

Chemistry

81. The species which by definition has zero standard molar enthalpy of formation at 298 K is
 A) Br_{2(g)} B) H_{2O(g)} C) Cl_{2(g)} D) CH_{4(g)}
82. Enthalpy of neutralization of all the strong acids and strong bases have the same value because:
 A) Neutralization leads to the formation of water and salt
 B) Strong acids and bases are ionic substances
 C) Acids always give rise H⁺ ions and bases always furnish OH⁻ ions
 D) The net chemical change involve the combination of H⁺ and OH⁻ ions to form water
83. Heat of reaction at constant volume is the:
 A) Change in internal energy C) Change in enthalpy
 B) External work done D) Change in entropy
84. The relation between enthalpy of (H), pressure (P), Volume (V) and internal energy (E) is given by:
 A) E = H + PV B) H = E + PV C) H = E – PV D) H = E + P + V
85. Heat of neutralization is least when:

- A) NaOH is neutralized by CH_3COOH C) NaOH is neutralized by HCl
 B) NH_4OH is neutralized by CH_3COOH D) NH_4OH is neutralized by HNO_3
86. Equal volumes of equimolar molar hydrochloric acid and sulphuric acid are neutralized by dil. NaOH solution and x kcal and y kcal of heat are liberated respectively. Which of the following is true?
 A) $x = y$ B) $x = 2y$ C) $x = \frac{1}{2}y$ D) None of these
87. The enthalpy change (ΔH) for the neutralization of 1M HCl by caustic potash in dilute solution at 298 K is:
 A) -68 kJ B) -57.3 kJ C) -65 kJ D) -50 kJ
88. In the combustion of 20g of methane, 1.1×10^3 kJ heat is liberated. The heat of combustion of methane would be:
 A) +41.8 kJ/mol B) -83.6 kJ/mol C) -890 kJ/mol D) 16.72 kJ/mol
89. Standard enthalpy of BeO cannot be measured experimentally because
 A) It does not catch fire
 B) Protective layer of oxide covers the surface
 C) It reacts with N_2
 D) It dissolve in water
90. To determine the enthalpy of reaction indirectly which of the following is used?
 A) Glass calorimeter B) Bomb calorimeter C) Hess's law D) All of these
91. Which of the following reaction can be used to define the heat of formation of $\text{CO}_2(\text{g})$?
 A) $\text{C}(\text{graphite}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$ C) $\text{CH}_4(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$
 B) $\text{CO}(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$ D) $\text{C}_6\text{H}_6(\text{l}) + 7\frac{1}{2}\text{O}_2(\text{g}) \rightarrow 6\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l})$
92. If the rate law for a reaction is, $\text{rate} = k[\text{A}][\text{B}]^2$, the units for k would be:
 A) $\text{mole dm}^{-3} \text{s}^{-1}$ B) mol s^{-1} C) $\text{dm}^6 \text{mol}^{-2} \text{s}^{-1}$ D) $\text{mol}^2 \text{dm}^{-3} \text{s}^{-1}$
93. In a first order reaction, the concentration of the reactants is reduced to 25% in one hour. The half-life period of the reaction is:
 A) 2hr B) 4hr C) $\frac{1}{2}$ hr D) $\frac{1}{4}$ hr
94. The reaction rate increases with rise in temperature due to:
 A) increase in activation energy
 B) increase in effective collisions between molecules
 C) decrease in activation energy
 D) decrease in minimum kinetic energy (threshold energy) required for the reaction to occur
95. What fraction of a reactant remains after 40 min if $t_{1/2}$ is 20 min for a first order reaction:
 A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{1}{8}$ D) $\frac{1}{6}$
96. The rate of constant of a reaction is $3 \times 10^4 \text{s}^{-1}$. The order of the reaction is:
 A) two B) one C) zero D) can be predicted
97. The following mechanism has been proposed for the reaction of NO with Br_2 to form NOBr:
 Step I $\text{NO}(\text{g}) + \text{Br}_2(\text{g}) \xrightarrow{\text{Fast}} \text{NOBr}_2(\text{g})$
 Step II $\text{NOBr}_2(\text{g}) + \text{NO}(\text{g}) \xrightarrow{\text{Slow}} 2\text{NOBr}(\text{g})$
 If the second step is the rate determining step, the order of the reaction with respect to $\text{NO}(\text{g})$ is:
 A) 1 B) 3 C) 0 D) 2
98. At low temperature, the reaction $\text{CO}(\text{g}) + \text{NO}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{NO}(\text{g})$ is zero order in CO and second order in NO_2 . The rate law is, $\text{rate} =$
 A) $k[\text{CO}][\text{NO}_2]$ B) $k[\text{NO}_2]$ C) $k[\text{CO}]^2[\text{NO}_2]$ D) $k[\text{NO}_2]^2$
99. Half life of 10g of a radioactive isotope is 10 days. The half life of 20g is:
 A) 5 days B) 10 days C) 20 days D) 40 days
100. The rate of reaction doubles when concentration of reactant is increased four times. The order is:
 A) $\frac{1}{2}$ B) 2 C) 1 D) 4
101. In the presence of a catalyst, the heat evolved or absorbed during the reaction:
 A) increase C) remains unchanged
 B) decreases D) may increase or decrease
102. Rate law for the reaction $\text{A} + 2\text{B} \rightarrow \text{C}$ is found to be
 $\text{Rate} = k[\text{A}][\text{B}]$
 Concentration of reactant 'B' is doubled, keeping the concentration of 'A' constant, the value of rate constant will be:
 A) the same B) doubled C) quadrupled D) halved
103. The enthalpy change of a reaction does not depend on
 A) initial and final enthalpy change of reaction
 B) state of reactants and products
 C) different intermediate reactions
 D) nature of reactants and products

104. If a gas absorbs 200 J of heat and expands by 500 cm³ against a constant pressure of $2 \times 10^5 \text{ Nm}^{-2}$, then change in internal energy is
 A) - 200 J B) + 100J C) -100J D) + 300J
105. The internal energy of a substance does not depend upon
 A) translational energy C) vibrational energy
 B) energy due to gravitational pull D) rotational energy
106. Which one of the following statements is false?
 A) temperature is a state function
 B) change in the state depends upon initial and final state
 C) work is a state function
 D) work appears at the boundary of the system
107. Bond energy of N-H, H-H, and N≡N bonds are Q_1 , Q_2 and Q_3 ; ΔH of $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ is:
 A) $Q_3 + 3Q_2 - 2Q_1$ C) $2Q_1 - Q_3 - 2Q_2$
 B) $Q_3 + 3Q_2 - 6Q_1$ D) $Q_1 + Q_2 - Q_3$
108. For an endothermic reaction, where ΔH represents the enthalpy of the reaction in kJ/mol, the minimum value for the energy of activation will be
 A) less than ΔH B) more than ΔH C) zero D) equal to ΔH .
109. Which of the following equations represent standard heat of formation of C_2H_4 ?
 A) $2\text{C (diamond)} + 2\text{H}_2 (\text{g}) \rightarrow \text{C}_2\text{H}_4 (\text{g})$
 B) $2\text{C (graphite)} + 2\text{H}_2 (\text{g}) \rightarrow \text{C}_2\text{H}_4 (\text{g})$
 C) $2\text{C (diamond)} + 4\text{H (g)} \rightarrow \text{C}_2\text{H}_4 (\text{g})$
 D) $2\text{C (graphite)} + 4\text{H (g)} \rightarrow \text{C}_2\text{H}_4 (\text{g})$
110. The difference between heats of reaction at constant pressure and constant volume for the reaction:
 $2 \text{C}_6\text{H}_6(\text{l}) + 15 \text{O}_2 (\text{g}) \rightarrow 12 \text{CO}_2 (\text{g}) + 6\text{H}_2\text{O}(\text{l})$ at 25°C in kJ is:
 A) -7.43 B) -3.72 C) +3.72 D) +7.43
111. The enthalpy change (ΔH) for the reaction, $\text{N}_2(\text{g}) + 3\text{H}_2 \rightarrow 2\text{NH}_3 (\text{g})$ is -92.38 kJ at 298: K. The internal energy change (ΔE) at 298 K is:
 A) -92.38 kJ B) -97.34 kJ C) -87.42 kJ D) -89.9 kJ
112. The work done by a system is 10 joule, when 40 joule heat is supplied to it. What is the increase in internal energy of system?
 A) 30 J B) 40 J C) 50 J D) 20 J
113. The increase in internal energy of the system is 100J when 300 J of heat is supplied to it. What is the amount of work done by the system:
 A) - 200 J B) - 300 J C) + 200 J D) - 400 J
114. Heat required to raise the temperature of 1 mol of a substance by 1°C is called?
 A) specific heat B) water equivalent C) molar heat capacity D) specific gravity
115. If at 298 K the bond energies of C-H, C-C, C=C and H-H bonds are respectively 414, 347, 615 and 435 kJ mol⁻¹, the value of enthalpy change for the reaction
 $\text{H}_2\text{C} = \text{CH}_2 (\text{g}) + \text{H}_2 (\text{g}) \rightarrow \text{H}_3\text{C} - \text{CH}_3 (\text{g})$ at 298 K will be
 A) +250 kJ B) -250kJ C) +125 kJ D) -125 kJ
116. An ideal gas expands in volume from $1 \times 10^{-3} \text{ m}^3$ to $1 \times 10^{-2} \text{ m}^3$ at 300 K against a constant pressure of $1 \times 10^5 \text{ Nm}^{-2}$. The work done is
 A) -900 kJ B) 270 kJ C) -900 J D) 940 kJ
117. The enthalpies of combustion of carbon and carbon monoxide are -393.5 and -283 kJ mol⁻¹ respectively. The enthalpy of formation of carbon monoxide per mole is
 A) -676.5 kJ B) 110.5 kJ C) -110.5 kJ D) 676.5 kJ
118. Consider the reaction $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ carried out at constant temperature and pressure. If ΔH and ΔE are the enthalpy and internal energy changes for the reaction, which of the following expressions is true?
 A) $\Delta H = 0$ B) $\Delta H < \Delta E$ C) $\Delta H = \Delta E$ D) $\Delta H > \Delta E$
119. The unit of specific reaction rate constant for a first- order (if the concentration is expressed in molarity) would be:
 A) s⁻¹ B) mole L⁻¹ s⁻¹ C) mole s⁻¹ D) mole L⁻¹
120. The activation energy for a simple chemical reaction $\text{A} \rightarrow \text{B}$ is E_a in forward direction. The activation energy for reverse reaction
 A) can be less than or more than E_a C) is always double of E_a
 B) is negative of E_a D) is always less than E_a
121. $3\text{A} \rightarrow \text{B} + \text{C}$, It would be a zero order reaction when
 A) the rate of reaction is proportional to square of concentration of A
 B) the rate of reaction remains same at any concentration of A
 C) the rate remains unchanged at any concentration of B and C
 D) the rate of reaction doubles if concentration of 'A' is increased to double
122. For a first-order reaction, the half-life period is independent of:

- A) initial concentration
B) first power of final concentration
C) cube root of initial concentration
D) square root of final concentration

123. If the rate of the reaction is equal to the rate constant, the order of the reaction is:

- A) 3
B) 1
C) 0
D) 2

124. Which of the following best explains the effects of a catalyst on the rate of a reversible reaction?

- A) it decreases the rate of the reverse reaction
B) It moves the equilibrium position to the right
C) It increases the kinetic energy of the reacting molecules
D) It provides a new reaction path with a lower activation energy

125. For a chemical reaction $A \rightarrow B$, the rate of reaction doubles when the concentration of A is increased four times. The order of reaction for A is:

- A) zero
B) two
C) one
D) half

126. The unit of second-order reaction rate constant is

- A) $L^{-1} \cdot mol^{-1} ds^{-1}$
B) $L \cdot mol^{-1} s^{-1}$
C) $L^2 \cdot mol^{-2} s^{-1}$
D) s^{-1}

127. Which of the following is incorrect about order of reaction?

- A) it is calculated experimentally
B) the order of reaction cannot be fractional
C) it is sum of powers of concentration in rate law expression
D) there is not necessarily a connection between order and stoichiometry of a reaction.

128. The rate law for the reaction $RCI + NaOH(aq) \rightarrow ROH + NaCl$, is given by $Rate = k [RCI]$. The rate of the reaction will be

- A) doubled on doubling the concentration of sodium hydroxide
B) halved on reducing the concentration of alkyl halide to one half
C) decreased on increasing the temperature of reaction
D) unaffected by increasing the temperature of the reaction

129. The equation for the rate constant is $k = Ae^{-E_a/RT}$. A chemical reaction will proceed more rapidly if there is a decrease in?

- A) k
B) E_a
C) A
D) T

130. Which curve represents zero-order reaction?



131. For the first-order reaction the half-life is 14 s. The time required for the initial concentration to reduce to 1/8th of its value is?

- A) 21 s
B) 42 s
C) 32 s
D) 14^2 s

132. The experimental data for the reaction $2A + B_2 \rightarrow 2AB$ is:

Exp.	[A]	[B ₂]	Rate
1.	0.50 M	0.50 M	1.6×10^{-4}
2.	0.50 M	1.00 M	3.2×10^{-4}
3.	1.00 M	1.00 M	3.2×10^{-4}

The rate equation for the above data is

- A) rate = k [B₂]
B) rate = k [A]²[B]²
C) rate = k [B₂]²
D) rate = k [A]² [B]

133. The rate equation for a chemical reaction is rate of reaction = k[X][Y]. Which of the following statements in this regard is true?

- i) The order of reaction is one
ii) The molecularity of reaction is two
iii) The rate constant depends upon temperature
A) 1 and 3 are correct
B) 2 and 3 are correct
C) 1 and 2 are correct
D) 1, 2 and 3 are correct

134. In a first-order reaction, the concentration of the reactant decreases from 0.8 M to 0.4 M in 15 minutes. The time taken for the concentration to change from 0.1 M to 0.025 M is?

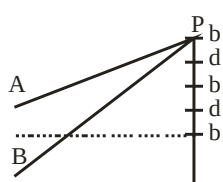
- A) 30 minutes
B) 7.5 minutes
C) 60 minutes
D) 15 minutes

135. Indicate the enzyme which catalyses the following reaction: $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

- A) Diastase
B) Urease
C) Zymase
D) Invertase

136. The catalyst used for the reaction $\text{HCOOH} \rightarrow \text{H}_2 + \text{CO}_2$ is?
 A) Copper B) Silica C) Alumina D) Iron
137. When a reaction proceeds in a sequence of steps, the overall rate is determined by:
 A) fastest step C) slowest step
 B) order of different steps D) molecularity of all the steps
138. The measurement of enthalpy change at standard condition means that we should manage the measurement at:
 A) -273°C & 1 atm B) 0°C at 1 atm C) 25°C & 1 atm D) 100°C at 1 atm
139. The enthalpy change for the reaction $\text{C}_2\text{H}_2 + \frac{5}{2}\text{O}_2 \rightarrow 2\text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$ is known as enthalpy of:
 A) formation of CO_2 C) fusion of C_2H_2
 B) combustion of C_2H_2 D) vaporization of C_2H_2
140. In a bomb calorimeter the reactions are carried out at:
 A) constant pressure C) constant temperature
 B) constant volume D) all

PHYSICS

141. Monochromatic green light of wavelength $5 \times 10^{-7}\text{m}$ illuminates a pair of slits 1 mm apart. The separation of bright lines on the interference pattern formed on a screen 2 m away is
 A) 0.25 mm B) 0.1 mm C) 1.0 mm D) 0.01 mm
142. If two coherent light waves produce minima of fourth order, the path difference between the waves is
 A) 5λ B) $5\lambda/2$ C) $7\lambda/2$ D) $9\lambda/2$
143. For a persistent interference to occur, it is necessary that phase difference of waves should
 A) be zero B) depend upon time
 C) change at constant rate D) not depend upon time
144. Waves transmit from one place to another:
 A) Wavelength C) Amplitude
 B) Mass D) Energy
145. A young's double – slit experiment set up for interference is shifted from water to air, then
 A) Fringe pattern disappear C) Fringe width increases
 B) Fringe width decreases D) Fringe width remains unchanged
146. In Young's double slit experiment, the central bright fringe can be identified
 A) By using white light instead of monochromatic light
 B) As it is narrower than other bright fringes
 C) As it is wider than other bright fringes
 D) As it has a greater intensity than the other bright fringes
147. When a wave goes from one medium to another, there is a change in the
 A) Velocity C) Frequency
 B) Wavelength D) Both "A" and "B"
148. When temperature increases, frequency of organ pipe:
 A) decreases C) increases
 B) remains the same D) becomes zero
149. If source and observer are moving towards each other with same speed and after crossing they are receding each other then frequency observed by observer:
 A) Decreases C) Increases
 B) Remains constant D) First increases then decreases
150. If b stands for bright fringe and d for dark one, what is the difference between PA and PB in the diagram?
 A) $\frac{\lambda}{2}$ B) λ
 C) $\frac{3\lambda}{2}$ D) 2λ
- 
151. Two coherent sources of light will produce destructive interference when the phase difference is:
 A) $\pi/2$ B) π C) 2π D) 4π
152. A slit of width a is illuminated by white light. For red light ($\lambda = 6500 \text{ \AA}$), the first minima is obtained at $\theta = 30^\circ$. Then the value of a will be

(A) 3250 Å

(B) $6.5 \times 10^{-4} \text{ mm}$

(C) $13 \times 10^{-7} \text{ m}$

(D) $2.6 \times 10^{-4} \text{ cm}$

153. Yellow light is used in single slit diffraction experiment with slit width 0.6 mm. If yellow light is replaced by X-rays, then the pattern will reveal
A) That the central maxima are narrower
B) No diffraction pattern
C) More number of fringes
D) Less number of fringes
154. Light of wavelength $5 \times 10^{-7} \text{ m}$ passes through a diffraction grating with 4×10^3 lines per centimeter. The frequency of the light used will be
A) $2 \times 10^9 \text{ Hz}$
B) $5 \times 10^9 \text{ Hz}$
C) $6 \times 10^{14} \text{ Hz}$
D) $0.6 \times 10^{14} \text{ Hz}$
155. If a monochromatic light of wavelength 600-nm light is incident on a diffraction grating that has ruling separation of $2.4 \times 10^{-6} \text{ m}$. The second order line occurs at a diffraction angle of:
(A) 0°
(B) 30°
(C) 45°
(D) 60°
156. The spacing between adjacent slits on a diffraction grating is 3λ . The diffraction angle of first order diffraction is
A) $\sin(\theta/2) = 1/3$
B) $\sin\theta = 1/3$
C) $\sin\theta = 2/3$
D) $\sin\theta/3 = 1/3$
157. An open pipe produces fundamental frequency 'f'. When dipped in water so that $2/5$ of its length is under
A) $\frac{2}{5} f$
B) $\frac{5}{6} f$
C) $\frac{5}{2} f$
D) $\frac{5}{12} f$
158. The wave front formed at a very large distance from a line source is
A) Cylindrical wave front
B) Plane wave front
C) Spherical wave front
D) Elliptical wave front
159. The distance between two particles on string is 10 cm. If the frequency of wave propagating in it is 400Hz and its speed is 100 m/s then the phase difference between the particles will
A) $8\pi \text{ rad}$
B) $0.8\pi \text{ rad}$
C) $80\pi \text{ rad}$
D) $0.16\pi \text{ rad}$
160. A particle on the trough of a wave at any instant will come to the mean position after a time (T = time period)
(A) $T/2$
(B) $T/4$
(C) T
(D) $2T$
161. In stationary waves, antinodes are the points where there is
(a) Minimum displacement and minimum pressure change
(b) Minimum displacement and maximum pressure change
(c) Maximum displacement and maximum pressure change
(d) Maximum displacement and minimum pressure change
162. Two waves are approaching each other with a velocity of 20 m/s and frequency n . The distance between two consecutive nodes is
(A) $\frac{20}{n}$
(B) $\frac{10}{n}$
(C) $\frac{5}{n}$
(D) $\frac{n}{10}$
163. A cylindrical tube, open at both ends, has a fundamental frequency f_0 in air. The tube is dipped vertically into water such that half of its length is inside water. The fundamental frequency of the air column now is
A) $3f_0/4$
B) f_0
C) $f_0/2$
D) $2f_0$
164. A standing wave having 2 nodes and 1 antinodes is formed between two atoms having a distance 1.21 Å between them. The wavelength of the standing wave is
(A) 1.21 Å
(B) 2.42 Å
(C) 6.05 Å
(D) 3.63 Å
165. Beats are the result of
(a) Diffraction
(b) Destructive interference
(c) Constructive and destructive interference
(d) Superposition of two waves of nearly equal frequency
166. If the ratio of amplitude of wave is 2 : 1, then the ratio of maximum and minimum intensity is
(A) 9 : 1
(B) 1 : 9
(C) 4 : 1
(D) 1 : 4
167. Energy is not carried by which of the following waves
(A) Stationary
(B) Progressive
(C) Transverse
(D) Electromagnetic
168. The tension in a piano wire is 10N. What should be the tension in the wire to produce a note of double the frequency

- (A) 5 N (B) 20 N (C) 40 N (D) 80 N
169. The first overtone in a closed pipe has a frequency
 (a) Same as the fundamental frequency of an open tube of same length
 (b) Twice the fundamental frequency of an open tube of same length
 (c) Same as that of the first overtone of an open tube of same length
 (d) None of the above
170. The wavelength is 120 cm when the source is stationary. If the source is moving with relative velocity of 60 m/sec towards the observer, then the wavelength of the sound wave reaching to the observer will be (velocity of sound = 330 m/s)
 (A) 98 cm (B) 140 cm (C) 120 cm (D) 144 cm
171. A source of sound emits waves with frequency f Hz and speed V m/sec. Two observers move away from this source in opposite directions each with a speed $0.2 V$ relative to the source. The ratio of frequencies heard by the two observers will be
 (A) 3 : 2 (B) 2 : 3 (C) 1 : 1 (D) 4 : 10
172. A man sitting in a moving train hears the whistle of the engine. The frequency of the whistle is 600 Hz
 (A) The apparent frequency as heard by him is smaller than 600 Hz
 (B) The apparent frequency is larger than 600 Hz
 (C) The frequency as heard by him is 600 Hz
 (D) None of the above
173. The direction of propagation of electromagnetic wave is given by
 A) Vector $\vec{E}$ B) Vector $\vec{B}$
 C) Vector $\vec{E} \times \vec{B}$ D) perpendicular to $\vec{E} \times \vec{B}$
174. The electric and magnetic field of an electromagnetic wave are
 A) in opposite phase and perpendicular to each other
 B) in opposite phase and parallel to each other
 C) in phase and perpendicular to each other
 D) in phase and parallel to each other
175. In a vacuum, all electromagnetic waves have the same
 A) wavelength B) frequency C) speed D) amplitude.
176. The similarity between the sound waves and light waves is
 (A) Both are electromagnetic waves
 (B) Both are longitudinal waves
 (C) Both have the same speed in a medium
 (D) They can produce interference
177. Diffraction pattern cannot be observed with
 (A) One narrow slit (B) Two narrow slits
 (C) Large number of narrow slits (D) One wide slit
178. The ratio of the wavelengths of two spectral lines if the 2nd order image of one line coincides with the 3rd order image of the other line, both lines are examined by means of the same grating, is:
 (A) 1 : 4 (B) 1 : 5 (C) 2 : 3 (D) 3 : 2
179. A light is incident normally on a grating which has 2500 lines/cm. The grating element is:
 (A) $\frac{1}{2500}$ cm (B) $\frac{1}{3500}$ cm (C) $\frac{1}{2500}$ cm⁻¹ (D) None
180. Highest order image in diffraction grating is expressed as:
 A) $\frac{d}{\lambda}$ B) $\frac{1}{N\lambda}$ C) Both "A" and "B" D) $\sin^{-1} \frac{d}{\lambda}$

ENGLISH

Choose the correct word words to complete each sentence.

181. Through the _____ of insects, a man came running.
 (A) Hail (B) Crowds (C) Hale (D) Filigree

182. He has uncanny _____ of being able to see immediately where the problem lies.
 A) knack C) complication
 B) Jejune D) vulnerability
183. I love to read mystery novels where the main character's safety is in _____.
 A) assiduity C) embellishment
 B) emblazonment D) Jeopardy
184. That, the trivial cause of so many momentous happenings, _____ the one thing of which details evaded him.
 A) was C) were
 B) are D) have

SPOT THE ERROR: In the following sentences some segments of each sentence are underlined. Your task is to identify that underlined segment of the sentence, which contains the mistake that needs to be corrected. Fill the circle corresponding to that letter under the segment in the MCQ Response Form.

185. Katherine had no parents and was married from the house of an aunt in ealing.
 A B C D
186. It happened that one of the animals entered a melon-field, and that a melon stuck into its throat.
 A B C D
187. Life we spend in seminary and vocational institutions ameliorates our perspicacious denominations.
 A B C D
188. Pakistan was a blessing for the Indian Muslims but today's Pakistan is not Pakistan they had
 A B C D
189. Of gold and wheat, former is the more expensive yet the latter more vital
 A B C D
190. Toward the mountains it was like looking into driving rain-even as she watched, the sun was blotted away
 A B C D
 with a fresh onrush of them.

In each of the following questions, four alternative sentences are given Choose the CORRECT one and fill the circle corresponding to that letter in the MCQ Response Form.

191.
 A) One of the men now stepped forward, saying to his friends: "You remain quiet, and leave this fellow to me."
 B) One of the mens now stepped forward, saying to his friends: "You remain quite, and leave this fellow for me."
 C) One of the mens now stepped forward, saying to his friends: "You remain quiet, and leave this fellow to me."
 D) One of the men now stepped forward, saying to his friends: "You remain quite, and leave this fellow for me."
192.
 A) There are Pakistanis who go to USA in order to study and stay there.
 B) There are the Pakistanis who go to USA in order to study and stay there.
 C) There are Pakistanis who go to the USA in order to study and stay there.
 D) There are the Pakistanis who go to the USA in order to study and stay there.
193.
 A) Since the Chinese business is expanding in Pakistan, many desired to learn the Chinese.
 B) Since the Chinese business is expanding in Pakistan, many desired to learn Chinese.
 C) Since Chinese business is expanding in Pakistan, many desired to learn the Chinese.
 D) Since the Chinese business is expanding in the Pakistan, many desired to learn Chinese.
194.
 A) A year ago, they made a unified plan on a united front to ask a unique question from an MNA.
 B) An year ago, they made a unified plan on a united front to ask a unique question from an MNA.
 C) A year ago, they made a unified plan on a united front to ask a unique question from a MNA.
 D) A year ago, they made a unified plan on an united front to ask a unique question from an MNA.
195.
 A) In Maldives, an honourary post was given to an heir in a house in an hourly meeting.
 B) In Maldives, a honorary post was given to a heir in a house in an hourly meeting.
 C) In the Maldives, an honourary post was given to an heir in a house in an hourly meeting.

D) In the Maldives, an honorary post was given to a heir in a house in an hourly meeting.

196.

- A) An SMS was sent to an MBA student sending him an information about an equipment lying beside the piano in the Fortress Square.
- B) An SMS was sent to an MBA student sending him information about an equipment lying beside the piano in the Fortress Square.
- C) A SMS was sent to a MBA student sending him a information about an equipment lying beside the piano in the Fortress Square.
- D) An SMS was sent to an MBA student sending him an information about an equipment lying beside piano in the Fortress Square.

197.

- A) He then struck the man himself a similar blow, which felled him to the earth like a log.
- B) He then struck the man himself a similar blow, which fell him to the earth like a log.
- C) He then struck the man himself a similar blow, which felled him on the earth like a log.
- D) He then struck the man himself a similar blow, which fell him on the earth like a log.

198.

- A) Uninfluenced by the severity of his punishment, the man mounted his camel and went to the next village, and again gave himself out as a great doctor.
- B) Uninfluenced by the severity of his punishment, the man mounted his camel and went on to the next village, and again gave himself out as a great doctor.
- C) Uninfluenced by the severity of his punishment, the man mounted his camel and went on to the next village, and again gave himself as a great doctor.
- D) Uninfluenced by the severity of his punishment, the man mounted his camel and went to the next village, and again gave himself as a great doctor.

In each of the following questions, four alternative meanings of a word are given. You have to select the NEAREST CORRECT MEANING of the given word and fill the appropriate Circle on the MCQ Response Form.

- | | | | | |
|------|-------------------------------------|---------------|-----------------|------------------|
| 199. | Jubilant
A) Ecstatic | B) Resultant | C) Hazardous | D) Ephemeral |
| 200. | Industry
A) Insight | B) Enigma | C) Eccentricity | D) Tenacity |
| 201. | illumination
A) Radiance | B) Brawl | C) Diligence | D) Ken |
| 202. | Juvenile
A) Fledgling | B) Virago | C) Vegetated | D) Veneered |
| 203. | Judgement
A) Adjudication | B) Embodiment | C) Absorption | D) Deterioration |

In each of the following questions, four alternative meanings of a word are given. You have to select the opposite in meaning of the given word and fill the appropriate Circle on the MCQ Response Form.

- | | | | | |
|------|-------------------------------|------------|------------|--------------|
| 204. | Kindred
A) Maven | B) Serene | C) Amalgam | D) Alien |
| 205. | Jealousy
A) Rivalry | B) Elation | C) Envy | D) Adoration |